

CC Docket No. 97-160

No. of Copies rec'd_
List A B C D E

TABLE OF CONTENTS

Introduction and Summary	1
Efficiency	4
Unbundled Network Elements	7
Overview of Expenses	8
Determining Customer Locations	10
Customer Location Data	10
Geocode Data	10
Road Surrogate Data	12
Methodology for Estimating the Number of Customer Locations	13
Optimization	15
Outside Plant Input Values	17
Cost of Copper Cable	17
Use of 24 and 26 Gauge Copper	17
24 Gauge Aerial Copper Cable	21
24 Gauge Buried Cable	25
Aerial Fiber Cable	26
Underground Fiber Cable	28
Buried Fiber Cable	28
Cable Fill Factors	29
Variance Among Density Zones	29
Distribution Fill Factor	29
Feeder Fill Factors	29
Fiber Fill Factors	30
Structure Costs	30
Costs of Aerial Structure	30
Underground Structure Costs	32
Buried Structure Costs	33
Plant Mix	33
Alternatives to Nationwide Mix	35
Structure Sharing	36
Serving Area Interfaces	40
Switching and Interoffice Facilities	42
Switch Costs	42
Adjustments to Data	42
Methodology	46
Accounting Changes in Costs Over Time	46
Treatment of Switch Upgrades	47
Switch Cost Estimates	48
Use of the LERG	49
Other Switching and Interoffice Transport Inputs	49
Analog Line Offset	49
Switch Capacity Constraints	49
Switch Port Administrative Fill	50
Trunking	50
Transport Cost Inputs	50

Expenses	51
Plant Specific Operations Expenses	51
Nationwide Estimates	51
Converting Expense Estimates to Current Values	59
GSF Investment	59
Common Support Service Expense	60
Nationwide Estimates	60
Data Source	60
Regression Methodology	61
Removal of One-Time Expenses and Non-Supported Expenses	65
Removal of Non-Supported Marketing Expenses	65
Removal of Non-Supported Customer Operations Expenses	67
Converting Expenses to 1999 Values	68
Estimates of Corporate Operations, Customer Operations and	68
Plant Non-Specific Expenses	68
Capital Costs	75
Method of Depreciation	75
Depreciation Lives and Future Net Salvage Percentages	76
Attachments	

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of)	
)	
Federal-State Joint Board on)	CC Docket No. 96-45
Universal Service)	
)	
Forward-Looking Mechanism)	CC Docket No. 97-160
For High Cost Support for)	
Non-Rural LECs)	

COMMENTS OF SPRINT CORPORATION

Sprint Corporation ("Sprint"), on behalf of its local, long distance and wireless divisions, submits its Comments in response to the *Further Notice of Proposed Rulemaking* ("FNPRM")¹ issued by the Commission on May 28, 1999.

INTRODUCTION AND SUMMARY

Section 254(b) of the Telecommunications Act of 1996 sets forth the principles for the preservation and advancement of universal service. As embodied in that section, it is clear the Congress recognized that the federal universal service program is to promote and preserve access to quality telecommunications and information services for customers residing in rural, insular, and high cost areas, at rates which are affordable and reasonably comparable to the rates for similar services in urban areas. Integral to this concept is the clear recognition and understanding that the cost of serving rural, insular customers is higher than the cost of serving urban customers.

¹ *Federal-State Joint Board on Universal Service*, CC Docket No. 96-45; *Forward-Looking Mechanism for High Cost Support for Non-Rural LECs*, CC Docket No. 97-160, *Further Notice of Proposed Rulemaking*, FCC 99-119 (rel. May 28, 1999).

Sprint appreciates that the Commission has largely recognized and reflected this difference in its model platform. Unfortunately, it has failed to do so in its input phase.

The current set of investment and expense input values upon which comment is sought in the FNPRM was designed to represent - and in many cases is based on the data of - the largest operating Local Exchange Carriers ("LECs") in the country. 91 companies meet the non-rural carrier criteria for federal USF purposes. Of these 91 companies, the largest 10 carriers account for nearly 50% of the customers served by "non-rural" LECs. The largest "non-rural" company serves 160 times more customers than the smallest "non-rural" company. Acknowledging even the slightest degree of influence related to company size and economies of scope and scale on the overall cost of providing service - a point on which there is no doubt - leads to serious concerns regarding the ability of one set of national inputs to estimate adequately the costs for efficient providers characterized by such variation in size. For example, the Commission's proposed single set of national inputs contains, perhaps unavoidably, an urban bias due to the overwhelming relative size of the Regional Bell Operating Companies ("RBOCs") and the fact that the majority of their customers live in urban areas.

The driving principle of universal service is quite simple - it costs more to serve rural customers than to serve urban customers. It is an obvious paradox to this most basic principle to suggest that a single set of national input values could adequately predict the cost of serving Charco, Texas, as well as Dallas Texas. (Charco, Texas has 67 customers and is served by Central Telephone Company of Texas, a Sprint Local Division company meeting the current non-rural carrier criteria designation.) While Sprint wishes to acknowledge the diligent efforts of the Commission's staff in the development of the proposed national input values, at the same time, Sprint must continue to express its grave concern that "one size does not fit all!" To help illustrate the fallacy of a one size

fits all approach to cost estimation, Sprint has included in this filing a comparison of its non-rural serving territories with those of the corresponding RBOC in each relevant state (*see* Attachment 1). With the exception of its Nevada operation, Attachment A demonstrates that Sprint consistently serves a much more rural, less dense serving area than the corresponding RBOC. Whether measured in terms of customers served, customer density, or number of metropolitan cities served, Sprint's non-rural company serving areas are the antithesis of the RBOC's operation within those same states.

As discussed below in more detail, Sprint believes that in attempting to justify one set of national inputs, what some casually dismiss as inefficiencies are actually unavoidable cost differences due to extreme differences in company size as well as rural-versus-urban customer serving territories. While it is no doubt easier to develop and implement one set of national inputs, administrative ease does not eliminate these very real and dramatic market condition variances. Customers residing in smaller non-rural LEC territories, such as Sprint's, should not be denied adequate universal service support merely for purposes of administrative ease.

As outlined in more detail below, Sprint makes three recommendations in response to the Commission's request for comments. First, there are significant errors in certain of the input methodologies that will affect all companies. It is imperative that these errors be corrected prior to the model being used to calculate federal universal service support. Second, the input values suggested by the Commission do not reflect the forward-looking economic costs of all efficient providers, including Sprint. In order to correct this inequity, the Commission may choose to do one of two things. It may create multiple input sets to reflect legitimate differences in costs incurred by providers. Alternatively, it can continue to depend on a single set of inputs, however, it must guarantee that that current funding levels (i.e. "hold harmless") are maintained so that no carrier is

harmful by such homogenous input values. Also, if a single set of inputs is used, the Commission must make clear that the results from the model are not appropriate for any company specific regulatory filing such as unbundled network elements (“UNEs”), interconnection or access proceedings. Finally, if a single set of inputs is used, the Commission may wish to re-evaluate treating mid-sized LECs as non-rural.

EFFICIENCY

In paragraphs 20-22 of the FNPRM the Commission discusses briefly the issue of appropriate forward-looking inputs for the Synthesis Model; specifically, the decision to use nationwide average inputs rather than company-specific inputs. Although the Commission seeks comment on company-specific alternatives for certain inputs values; overall it states that nationwide averages are preferred. The single reason provided for preferring nationwide inputs is that national averages might “mitigate rewards to less efficient companies” (paragraph 21). While Sprint strongly agrees that rewarding inefficiency is not in the public’s interest, Sprint asserts that it would be advantageous to review certain facts regarding the intent and use of the Synthesis Model (or any of the proxy models presented to the Commission).

FACT #1: The Synthesis Model is designed to estimate the forward-looking economic costs that would be incurred by an efficient carrier in the provision of the supported services.

(FNPRM paragraph 22).

FACT #2: Forward-looking economic costs, as defined by the Commission, require that all inputs be “valued at current prices”²

² *Federal-State Joint Board on Universal Service*, Report and Order, 12 FCC Rcd 8776 at page 124 (“1st Report and Order”).

FACT #3: Current prices for inputs (such as central office switches, cable, structure and more) vary greatly, depending on the size and scale of the purchaser of those inputs.

FACT #4: These variations in the prices of inputs do *NOT* reflect differences in the efficiency of the provider. Instead, they reflect bargaining power and such things as volume purchase discounts. The FNPRM explicitly refers to this “superior bargaining power” in multiple paragraphs beginning with paragraph 78, and makes adjustments for it in the input calculations.

FACT #5: Returning to Fact #1, this means that the efficient carrier serving 500,000 lines will have different costs, and face different prices for inputs, than would be faced by the efficient carrier serving 15 million lines.³

Given these facts, the Commission is faced with two choices. The first choice would be to allow inputs to vary depending on the scale (and relative purchasing power) of the efficient provider being modeled. Contrary to the statement above, this would not “reward” inefficiency. Rather, and much more importantly, it will reflect the realities that efficient providers of different scales will face as they enter the market. It would be folly to assume that every new and efficient provider offering basic telephone service will possess the scale economies and purchasing power that SBC possesses as a result of serving 35 million access lines, or Ameritech possesses as a result of serving 20 million access lines. Yet the use of a single, RBOC-dominated input set makes that very assumption. If such a set of inputs is used to obtain costs, and those costs are then used as a measure of the costs that any company may recover, a smaller company serving a total of 500,000 access lines will be

³ In its recent ARMIS/ITTA Orders the Commission acknowledged that carriers of different size (in particular mid-sized LECs) face different cost constraints and operate under different circumstances than the BOCs and GTE. See, *Petition for Forbearance of the Independent Telephone & Telecommunications Alliance*, FCC 99-108, Sixth Memorandum Opinion and Order, rel. June 30, 1999; *1998 Biennial Regulatory Review – Review of Armis Reporting Requirements*, CC Docket No. 98-117, Report and Order rel. June 30, 1999; *1998 Biennial Regulatory Review – Review of Accounting and Cost Allocation Requirements*, CC Docket No. 98-81, Report and Order rel. June 30, 1999.

severely penalized because it will not have the “superior bargaining power” mentioned in the FNPRM. The company will be penalized not because it is inefficient, but simply because it is not large. The only viable solution to this problem is for the Commission to use multiple sets of inputs, regardless of the additional time and resources multiple sets of inputs would undoubtedly require. Alternately, the Commission could use a single set of inputs but apply those inputs and the model results *only to those companies for which those inputs are appropriate*.

At this point in time, the Commission has taken significant steps toward this second choice by adopting the Joint Board’s recommendation to separate rural companies from non-rural companies with regard to an explicit, federal universal service support mechanism. Omitting rural companies from the process up to this point has the beneficial effect of not applying the model results to companies for which they do not make sense. Furthermore, there is no question but that the overwhelming majority of lines served by non-rural companies are served by extremely large local providers such as the RBOCs and GTE. According to the workbooks provided on the Commission’s website, those companies serve more than 95% of non-rural lines. Consequently, if a single set of inputs is used, it is clear that the set must appropriately represent the input prices paid by the RBOCs and GTE. However, it is equally clear that such a set of inputs should then be applied *only to those same companies*, and should not be applied to the other non-rural companies such as Cincinnati Bell, Alliant, and the Sprint Local Telephone Companies.

Throughout the past year, Sprint has provided a significant amount of cost information to the Commission and other interested parties through meetings and *ex parte* presentations. This information reflects the actual prices currently paid for inputs, consistent with the Commission’s definition of forward-looking economic cost. The non-rural Sprint Local Telephone Companies modeled in the Commission’s Synthesis Model are efficient. 90% of access lines served by those

companies operate under price regulation, and thus Sprint faces similar incentives for efficiency as firms operating in a truly competitive market. The prices that Sprint pays for inputs are the prices that any efficient provider *of Sprint's size* would pay for the same input. To the extent that these differ from prices paid by an RBOC, the Commission should acknowledge these differences in its model inputs. If the Commission chooses to decline to take such action, the Commission must recognize that the Synthesis Model and its nationwide average inputs do not accurately represent mid-sized, efficient providers.

UNBUNDLED NETWORK ELEMENTS

Below, Sprint presents its insights regarding specific categories of inputs to the Synthesis Model. In many cases these comments build on the material previously presented to the Commission. In all cases, Sprints' comments should be considered in the context of using the Synthesis Model for purposes of universal service only. In paragraph 22 of the FNPRM, the Commission states that it "make[s] no finding" with regard to whether nationwide average inputs would be appropriate for other purposes, such as estimating the costs of unbundled network elements. At this point in time, Sprint strongly urges the Commission to take a more definite position on this very important issue. Having actively participated in the Commission's input workshops and the input development process as a whole, it is Sprint's understanding that at no time did the Commission intend to develop inputs that might be used for UNE costing. Nor was the Commission developing a model platform to be used for UNE costing. In fact, in its *Platform Order*⁴, the Commission stated that it would incorporate the HAI switching module because "it would be simpler to implement" and noted that "for universal service purposes... switching costs are

less significant than they would be in, for example, a cost model to determine unbundled network element switching and transport costs” (*Platform Order*, paragraph 75).

The notion of a single set of nationwide inputs used to estimate UNE costs is antithetical to the fact that UNE prices must compensate providers for the forward-looking costs of the actual elements they are providing. Unlike federal universal service support, the pricing of UNEs does not provide for either a “hold harmless” or revenue neutral prospect. This fact heightens concerns for the degree to which national default inputs do not adequately and fairly estimate a specific company’s forward looking costs of provided UNEs. Companies that may be able to accept some level of inaccuracy in a set of national default inputs for a revenue neutral USF program, will likely object much more strenuously to the suggestion of using national default inputs which understate their costs of providing UNEs. Moreover, the use of national default “one size fits all” inputs clearly contradicts the intent of the Commission’s deaveraging rules which seeks to match the cost incurred in a specific market to the price of the UNEs in that market.

OVERVIEW OF EXPENSES

The cost of providing universal service is a function of capital investments in telecommunications plant and equipment *and* the associated expenses to deploy, maintain and operate those investments. In their current state, the Synthesis Model and national default inputs development efforts have focused on only one portion of the equation driving higher costs in rural areas. The area of focus thus far has been heavily geared towards the model calculations and inputs associated with deploying the capital investments in telecommunications plant and equipment. This is no doubt a critical component of the de-averaged cost estimation process. Given the necessary

⁴ *Federal-State Joint Board on Universal Service*, CC Docket No. 96-45, *Forward-Looking Mechanism for High Cost Support for Non-Rural LECs*, CC Docket No. 97-160, Fifth Report & Order rel. October 28, 1998 (“*Platform Order*”).

input modifications which fairly acknowledge equipment cost differences due to company size and specific market conditions affecting plant mix and construction costs, Sprint believes the investment modeling platform of the Synthesis Model is largely adequate for the purpose of calculating federal universal service support.

However, the current stage of development for both the Synthesis Model capabilities and the associated national default inputs for the *expenses* to deploy, maintain and operate telecommunications plant and equipment is in sharp contrast to sophistication and resources devoted to de-averaged investment modeling. The model and associated national default inputs in their current state assume absolutely no differentiation in direct maintenance loading percentages or per line expense items. (While calculating direct maintenance as a percentage of investment provides a minimal level of differentiation, the current suggestion of one set of national default inputs does not reflect valid differentiation in the direct maintenance loading percentage inputs.) As is the case with regard to the investment differences between rural and urban areas; that it is illogical and inconsistent to suggest that companies with extreme variances in overall size and serving territories could ever achieve 100% uniformity in the related expense areas. Differences in expenses exist today, and will continue to exist; no amount of theoretical diatribe will eliminate this reality in the future. Real companies will continue to provide universal service to real customers and it is ultimately the customers of those companies who benefit from adequate universal service support mechanisms. Sprint believes it is entirely appropriate and necessary to place an equal emphasis on the differentiation of inputs, including those for expenses, as has been dedicated to investment modeling over the last three years. Sprint sees no reason why the initial set of national default inputs cannot continue to evolve and improve into the future as has been the case with the model development over the last three years leading up the current version of the Synthesis Model. The

Commission's staff has been diligent in their efforts thus far, but Sprint believes the input portion of the cost estimation equation must continue to evolve beyond this initial national default effort.

To be sure, Sprint continues to advocate the use of forward-looking costs for both universal service and UNE cost estimates. Sprint does not, however, subscribe to a version of "forward looking costs" which ignores readily apparent realities and data, and results in cost estimates that are unobtainable to real companies serving real customers no matter what the quality and efficiency of their operations. Only through some level of differentiation in the model inputs can the forward-looking costs of differing companies serving differing markets be adequately estimated.

DETERMINING CUSTOMER LOCATION

Customer Location Data

Geocode Data

In paragraph 28, the Commission asks for comment regarding additional sources of geocoded customer locations and the availability of the geocode data from PNR Associates ("PNR"). At this point in time, Sprint makes no comment as to alternative sources of data, but welcomes the opportunity to provide comment on how the availability of the PNR data fails to meet the Commission's own criteria found in the *1st Report and Order* (at paragraph 250).

The creators of the Synthesis Model have gone to great lengths to incorporate all aspects of cost modeling into their model platform and to eliminate, to the extent possible, what has come to be known as 'pre-processing'. By utilizing actual data points (whether customer locations, road surrogate locations, or some combination of the two) and placing the clustering algorithm within the model platform, the Synthesis Model creators have allowed users complete flexibility with regard to all aspects of outside plant design. Most importantly, users can adjust the criteria used when creating customer serving areas or clusters. As a result, whatever locations are used in the clustering

algorithm must now be considered inputs to the model, just as cable costs or trenching costs are inputs.

The PNR data referred to in paragraphs 26-28 of the FNPRM remains unavailable to the overwhelming majority of users of the Synthesis Model. For the data to be truly available for review by a user, it must reside with the user or be provided to the user upon request. This was clearly the intent of the Synthesis Model creators, for if the location data is not in the hands of the user, all clustering options built into the Model are useless. In its current form, the Synthesis Model offers users the choice of clustering data points in different ways. If it was never Commission's intent for users to actually *use* the clustering algorithm, which by definition requires that the data be located with the user, why provide the user with options? Why provide the clustering algorithm to the user at all? In order for the "data" (PNR geocode data), "formulae and computations" (clustering and "*clustinf*" modules) to be truly available for review and comment, it is necessary that a user such as Sprint be able to run the data through the formulae and computations to see how they interact. It is not enough that another party run the data through the formulae, hand over the results, and say "trust us".

PNR's attempt to circumvent the Commission's criteria by providing users with the BIN files, derived from geocode data, is unacceptable. Providing users with BIN files, from which they may proceed to run the remaining portions of the model, is no different than if the Commission were to provide users with the output of the "*feedlist*" module and allow them to run only the remaining modules. For every other input used in the Synthesis Model, any user may 1) view the input, 2) change the input if desired, and 3) observe how the input interacts with the model's equations and algorithms. The same cannot be said for the inputs that are the PNR geocode data.

It is not available to all interested parties. It does not, therefore, meet the Commission's own most basic criteria.

Road Surrogate Data

In paragraph 34, the Commission requests comment on the use of the PNR road surrogate data for determining customer locations in the Synthesis Model. Sprint has historically been in favor of a surrogating method that locates customers along roads, and supports the Commission's decision to use such a system. Sprint also believes the Commission should weigh the advantages of using such a system when compared with using a proprietary and generally unavailable geocode data set. In fact, the benefits of using a geocode data set must be seriously questioned when the majority of points located in the high cost areas are not geocoded and are, therefore, road surrogates anyway. Sprint does not object to the use of the PNR road surrogate data, but welcomes this opportunity to clarify the record on two related points.

First, as discussed in paragraph 33, it is correct that Stopwatch Maps (at the request of Sprint) provided road surrogate data to the Commission for a limited number of states. However, for the Commission to dismiss the Stopwatch Maps data on the grounds of being non-comprehensive (including only six states) is somewhat puzzling. Sprint is not aware of any point at which the Commission officially requested that a comprehensive set of road surrogate data be provided for consideration for use in the Synthesis Model.

Second, in paragraph 34 the Commission seeks comment on the HAI proponents' claims that the PNR road surrogate algorithm may overstate the amount of outside plant needed to provide the supported services. This overtly agenda-driven argument, made by the HAI proponents many times over, is completely without validation. The HAI proponents have never made their geocode

data available to interested parties so that it might be compared side-by-side with road surrogate data for measures of dispersion. Moreover, it would be disastrous to combine some type of downward adjustment based on a perceived overstatement of needed plant with the Commission's decision to optimize the layout of the distribution plant. The decision to optimize in the distribution plant actually causes the model to build *less* than airline distance in many cases.⁵ As a result, there is extremely little consideration for natural barriers, rights of way, topography, regulatory barriers, road constraints and other factors that will prevent new, efficient providers from building plant 'as-the-crow-flies'. Yet the HAI Sponsors, in their continued attempts to drive costs down to an unreasonable level, would have the model build less than 'as-the crow-flies' by suggesting less plant is needed than the model produces. (This issue is addressed in more detail below in the Optimization portion of these comments).

Methodology for Estimating the Number of Customer Locations

The FNPRM tentatively concludes in paragraph 43 that PNR's process for determining the number of customer locations and current demand should be used in the Synthesis Model. Sprint welcomes the opportunity to comment on this conclusion and express its concerns regarding the PNR methodology.

First, it is Sprint's understanding that the PNR National Access Line Model (NALM) is the intellectual property of PNR and is not available to all interested parties, as required by the Commission's criteria. It is Sprint's understanding that the *output* of the model may be viewed/purchased by parties, and that an *explanation* of the workings of the model is available, but that the *actual econometric specification and computer code* that constitutes the model itself are not made

⁵ See HCPM Methodology, Bush, Kennet, Prisbrey and Sharkey with Gupta. In that document, graphical examples are

available to the public. Nor is any interested party in the position of actually running the model on their own hardware. Since this NALM model forms the foundation of line counts and locations that enter the Synthesis Model, it clearly falls under the Commission's definition of "underlying data, formulae and computations."

Second, it is Sprint's understanding that the NALM falls into the category of an econometric model known as a qualitative or limited dependent variable model, or probability model. As the NALM is described in the HAI Model documentation it determines "how likely it is that a household will have a first or second telephone line installed?" and other probabilities.⁶ All standard (and non-standard) limited dependent variable models produce standard measures that reveal how successful the model is at predicting outcomes; that is, measures that reveal how accurate the model is. Sprint is unaware of any filing on any record at all that documents the accuracy or predictive ability of PNR's NALM, particularly when it is used at such a disaggregated level as a census block, CBG, or wire center. Prior to blindly accepting PNR's methodology, Sprint strongly suggests that the Commission investigate and make available to all interested parties certain standard econometric measurements revealing goodness of fit, significance of variables, etc. that the NALM produces when used in the process of creating inputs to the Synthesis Model, particularly when the NALM is run at disaggregated levels. Sprint asserts that the Commission would not ask parties to accept its own econometric results without an opportunity to reproduce them and investigate the accuracy of the model and econometric specification. Yet by accepting the PNR methodology based on the NALM results, it is doing that very thing.

provided where nodes are added to customer locations to allow locations to be connected using less than airline distance.

⁶ HAI Model Methodology as filed with the State Corporation Commission of Kansas by Dr. Robert Mercer, April 27, 1999, page 25.

Sprint's concern is additionally justified by the wide degree of variation seen in the PNR line/location counts that are used in the Synthesis Model when compared with actual counts. Although on average the ratio of predicted lines to actual might fall within a reasonable range, understatements and overstatements of 50% or more are extremely common. This raises serious concerns as to the accuracy of the model results, particularly when the model is run at a wire center level. Sprint is aware that the Commission is in the process of requesting that LECs provide information on actual line counts, which indicates that the Commission will soon be able to undertake a comparative analysis of its own. It is important for the Commission to note, however, that although the Synthesis Model allows the use of actual line counts (at a wire center level) the model does not appear to adjust number of locations when line counts are adjusted. For example, in the case of the NALM underestimating the number of lines by 50%, it appears that the true-up currently built into the Synthesis Model would simply distribute more lines over the same number of locations, which would have the effect of artificially increasing line density and reducing costs.

OPTIMIZATION

In paragraphs 57-59, the FNPRM discusses the optimization routines built into the Synthesis Model and tentatively concludes that the model should be run with the optimization (for distribution plant) turned on. While optimization is a worthwhile goal for an economic model of an efficient provider, and efficient providers such as Sprint do strive to minimize costs, neither Sprint nor any other provider minimizes costs in a vacuum.

At paragraph 58 the Commission states that optimization "approaches what a network planning engineer would *attempt* to accomplish in developing a forward-looking network" (emphasis added). The reality, of course, is that engineer's optimized network will be constrained by such

things as topography, natural barriers, right-of-way, regulatory barriers, road constraints and more. If, for example, zoning restrictions in an area prohibit any provider, including a new efficient entrant, from placing aerial cable then the model is wrong to build aerial cable there just because it represents the least-cost technology. It is wrong because it reduces the forward-looking cost estimates to unobtainable fiction. No provider could ever achieve the modeled costs. The forward-looking cost estimates produced by the Synthesis Model should not assume conditions that are out of the control of a well-run company. For example, choosing the route layout that minimizes costs with regard to nothing else, as the Synthesis Model's optimization routine does, is an appealing theoretical exercise, but misplaced when determining the costs that a company would actually be allowed to recover. The Commission must keep in mind that the Synthesis Model will be used to calculate a *need* or a *shortfall*. In doing so it must consider the forward-looking costs that will actually be incurred by efficient providers using the least cost, available technologies and best industries practices, not those that would be incurred if all conditions were ideal. If the costs do not consider the actual conditions under which providers must operate, that need or shortfall will be understated.

It is for this reason, among others, that Sprint cautions the Commission regarding the appropriateness of "optimization" routines and algorithms. The optimization routine in the Synthesis Model that chooses between copper and fiber (for clusters that might be served by either) represents a fairly reasonable approach given that a new provider may indeed have the freedom to choose one or the other. However, efficient providers do not always have the choice to optimize plant mix (as suggested in paragraph 125) nor do they often have the choice to optimize plant

layout.⁷ For these reasons, Sprint strongly recommends that the Synthesis Model not use minimum cost as the sole determinant of plant mix. Moreover, the Synthesis Model's inputs should be allowed to vary to reflect to conditions under which any efficient provider must operate, conditions which will differ for different geographic areas and different sized providers.

OUTSIDE PLANT INPUT VALUES

Cost of Copper Cable

Use of 24 and 26 Gauge Copper

In actual practice, the selection of 24 or 26 gauge cable is driven by many factors, such as loop resistance design, size of the available conduit, whether the cable will have terminals cut into it or not, availability of cable in a particular gauge, etc. However, an attempt to model these numerous factors would get rather complex rather quickly. To simplify this process, Sprint has previously supported – and continues to support - a simple surrogate that uses the price of 26 gauge cable for cable that is 900 pairs and larger and the cost of 24 gauge cable when the cable size is less than 900 pairs.

The designation of cable as being “feeder” or “distribution” does not materially impact the installation cost of the cable. In actual practice, splicing may be somewhat higher in distribution due to more frequent tapering of cable sizes, branch splices, etc. However, Sprint feels that for modeling purposes, this difference is not material enough to cause concern.

As Sprint's cable cost data (provided to the Commission in numerous *ex parte* presentations and data requests) clearly demonstrates, there is a significant difference in the installation costs of

⁷ Sprint takes this opportunity to remind the authors of the FNPRM and the modelers that the “scorched node” approach used in the Synthesis Model refers *only* to the telephone plant, not to the rest of the world. Barriers and constraints that exist today will continue to exist for new, efficient providers and therefore operating within these constraints must be included as part of their costs of doing business.

aerial, buried and underground cable. The reason for this difference is simply that each involves totally different work activities. Underground cable is pulled through a conduit, aerial cable installation includes the placing of strand and lashing the cable to the strand, buried cable installation requires only that the cable be placed in a trench, or if plowed, the placement cost is included with cost of the structure.

Paragraph 66 – Feeder and Distribution

Sprint agrees with the tentative conclusion that the material cost of a cable is the same whether it is used for distribution or feeder.

Paragraph 68 – Distinguishing Underground, Buried, and Aerial Installation Costs.

Sprint agrees with the conclusion that there should be separate cable prices for the different installation types. The cost for buried, underground and aerial cable vary considerably as demonstrated by the cable cost data provided by Sprint in response to the Commission data request. It is appropriate to develop costs accordingly.

Paragraph 72– Cost Per Foot of Copper Cable

Sprint continues to have significant concerns regarding the use of the RUS data to develop cable costs. On January 29, 1999, Sprint provided extensive comments by an outside plant expert, experienced in the development and review of network construction costs, which detailed inconsistencies, material errors, mixing of material and labor costs, mixing of cable and structure costs in buried cable, inappropriate spreading of costs, and missing costs in the RUS data. Sprint

further demonstrated that the resulting Commission “costs” could not even survive a simple test of replicating the total RUS investment, by multiplying the footage of each cable placed by the Commission’s “cost”.

The Commission has chosen to ignore completely these basic, practical issues. No amount of statistical analysis will correct for the fact that the source data is not consistently developed, nor reported.

The fundamental problem with the RUS data set is that there has been no examination to ensure that the cost contained in each data point represents the same thing. If one data point for material cost contains only material cost, and another contains material, shipping and some of the installation cost, it is impossible to draw conclusions about the material cost. It is also fundamentally wrong to use the data in statistical analysis when serious uncertainties exist regarding whether the values for each of the variable are in fact consistent.

For instance, even after eliminating the outliers, the material cost of 25 pair buried cable ranges from under \$.30 a foot to over \$1.00 a foot. One must question whether any reasonable person would believe that a single RUS company would knowingly pay three times as much for cable as another, particularly with this data being publicly available! The answer clearly is that it would not. This simply indicates that the “costs” in these two data points do not represent the same thing. As such, any regression results that were produced using this data must be questioned.

In its January 29, 1999 *ex parte* comments, Sprint suggested that the Commission perform a simple “sanity check” on its proposed cable prices. This could be done simply by multiplying the footage of each type of cable placed in the RUS database by the proposed costs per foot. This *should* result in a total investment that is reasonably close to the original investment from the RUS data. Sprint’s analysis finds a significant shortfall.

Sprint has also pointed out technical errors in the RUS data. For instance, there is a “unit” in the RUS data for the cost of aerial messenger strand. Every foot of aerial cable requires a foot of messenger strand. But in the RUS data, there are 13 million feet of aerial cable and only 20,000 feet of messenger strand. Has the cost for the rest of the strand been buried in other costs? If so, which costs? Is it missing altogether because the cable was lashed on to an existing strand? It is impossible to know, and without this information it is impossible to trust the predicted values based on this data.

The NRRI data is fundamentally flawed source data. No significant effort has been made to ensure the source data is reliable. No amount of statistical analysis will correct for the fact that it is not known what costs are or are not included in the data set. In contrast, Sprint met with the Commission’s staff, and presented in great detail the source data, the method of collection of the data, the analysis of the data, the methods used to spread the costs, etc. for its own cable costs. The Commission’s staff has had the opportunity to review, question and satisfy itself that the data provided by Sprint is reliable, based on actual costs and was developed in a manner consistent with model purposes. This has not been the case with the RUS data.

Sprint believes that actual cable costs, as supplied in response to the Commission’s data request, are a better indicator of cable costs than the NRRI data. While Sprint is aware of the Commission’s desire to use publicly available data whenever possible, the benefit that the RUS data is publicly available is more than outweighed by uncertainties that exist regarding the validity and consistency of the data.

With regard to 26 gauge cable prices, the costs provided to the Commission for larger cables may already be the costs for 26-gauge cable, and should not be adjusted. For example, Sprint is not aware that cables larger than 3,000 pairs can even be purchased in 24 gauge. Furthermore, Sprint

does not purchase any significant quantity of larger-sized cable in 24 gauge. Knowing that it would be unreasonable to model a cable size that does not exist, or is not used, Sprint provided the cost of cable that does exist - the cost of 26-gauge cable. Sprint's cable costs for cable over 900 pair already assume a 26-gauge price. Finally, since some of these larger cable sizes are not even available in 24 gauge, the prices provided must clearly have already been those of 26 gauge cable and should not be adjusted.

It is interesting to note that, in the Commission's proposed pricing, 24 gauge underground cable tends to be *more* expensive than the same sized buried cable up to 1200 pairs in size (where it is 15% more expensive). At the next cable size, 1800 pairs, underground cable suddenly becomes 7% *less* expensive than buried - and the gap widens as the cables get larger. This conclusion - which cannot be reasonably supported by actual experience - may be the result of the substitution of 26 gauge prices for 24, where the 24 did not exist or is not often used.

Paragraph 76 - Cost Per Foot of Copper Cable

As discussed above, Sprint does not believe that any regression based upon flawed data is appropriate for the cable inputs. The question here is whether cable inputs should be based upon a statistical prediction using invalid data or on actual prices paid by Sprint and other companies. It is Sprint's understanding that companies have provided actual cable prices to the Commission. To the extent that these actual costs are consistent with the Commission's definition of forward-looking economic cost, Sprint sees no reason for the Commission to ignore this data.

24 Gauge Aerial Copper Cable

Paragraph 77

Sprint disagrees with the use of the NRRI study. Please see response to Paragraph 72.

Paragraph 78

Overall, Sprint agrees with the Commission that purchasing power increases with company size and hence cable material cost would be lower for a larger company. However, there is clearly a *range* of company sizes, and thus an associated *range* of purchasing power. By using the Bell Atlantic discount referred to in the FNPRM, the Commission has assumed that there is no range. The Commission further assumes that a LEC is either large or small, and that there is no middle ground. Sprint can attest to the fact that there is a middle ground.

With regard to cable purchases by efficient providers, obviously there would not be a single, uniform discount of 15% for every company. And most assuredly, all companies would not receive the discount that a company as large as Bell Atlantic receives. Sprint, along several other mid-sized companies, clearly falls into some middle ground and cannot purchase cable as inexpensively as Bell Atlantic can. The Commission cannot legitimately recognize that size equates to buying power and then saddle mid-sized companies such as Sprint with a discount that only an RBOC could achieve. This is a clear example of the need for multiple sets of inputs *or* the fact that the Commission must apply a single set of inputs only to those companies for which such inputs would be appropriate.

Regarding the cable discount, an even more fundamental issue remains. Is the 15% discount corrector is the NRRI study comparing apples and oranges? In order to make a valid comparison of the NRRI cable cost to the Bell Atlantic cable costs, one needs to know that the “costs” in both data sets represent the same number. Are both numbers the raw material cost? Does one include shipping, exempt material, warehousing or sales tax and the other does not? It is impossible to know the answers to these questions, particularly in light of the fact (stated above) that the RUS data itself is problematic and inconsistent. Unless there is solid evidence that the comparison mentioned